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PARTICIPANT-AWARE TASK REQUESTS

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ABSTRACT

A virtual, intelligent, or computational assistant (e.g., also referred to simply as an "assistant") is described that is configured to perform participant-aware task requests. For instance, when performance of a task is requested via a voice command (e.g., a spoken command, a verbal command, an utterance, etc.), the assistant may identify which people are present. The assistant may then perform the task involving the identified people (e.g., if the requested task is to "schedule a meeting for us," the assistant may identify that person A and person B are present and create a meeting event for person A and person B). This way, the assistant may perform participant-aware task requests.

DESCRIPTION

Assistants execute on counter-top devices, mobile phones, automobiles, and many other type of computing devices. Assistants output useful information, responds to users' needs, or otherwise performs certain operations to help users complete real-world and/or virtual tasks. Some assistants may perform operations involving a single user in response to voice requests from the single user. While performing operations involving a single user may be somewhat trivial, performing operations involving groups of people (i.e., operations involving users other than a requesting user) may be challenging for some assistants.

In many cases, a user may wish for operations involving groups of people to be performed but may not want to explicitly identify the members of the group. For example, user A may be in a meeting with users B and C, and wish for the assistant to perform an operation involving users A–C (e.g., scheduling another meeting with users A–C). User A may

not want to have to explicitly list the users involved in the operation and/or may simply want to request that the assistant perform the operation for “us.”

The example system shown in FIG. 1 provides an assistant that automatically identifies which users (i.e., people) are present when performance of a task is requested via a voice command and performs the task based on the identified users. For example, when a user verbally requests that the assistant to perform a task for “us,” the assistant may disambiguate the meaning of “us” by identifying the users present when the verbal request was made. The assistant may then perform the task with “us” being replaced by the identified users.

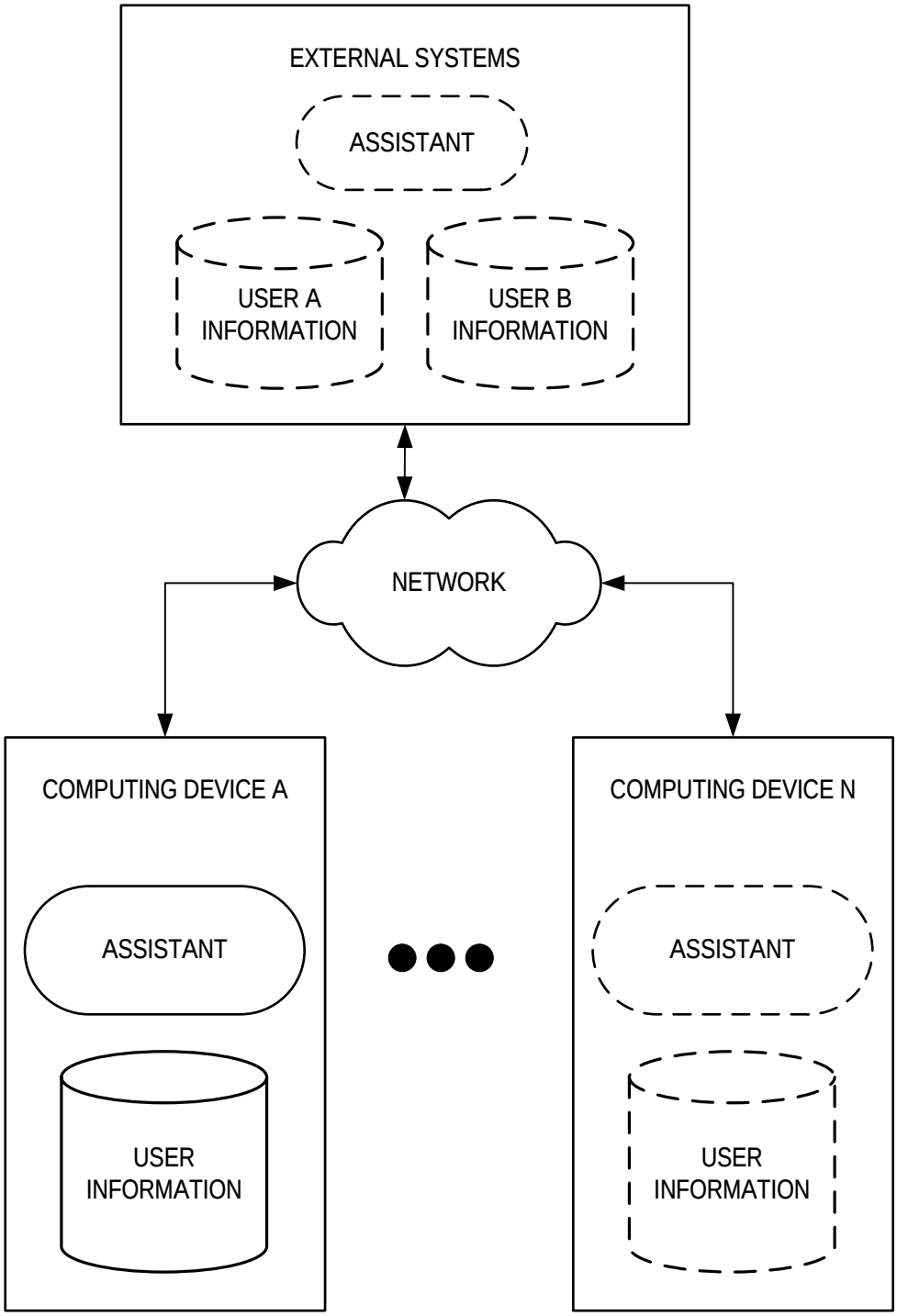

FIG. 1

The system of FIG. 1 includes one or more external systems and computing devices A–N communicating across a network with each of computing devices A–N executing an assistant

that performs operations involving groups of people. The network of FIG. 1 represents a combination of any one or more public or private communication networks, for instance, television broadcast networks, cable or satellite networks, cellular networks, Wi-Fi networks, broadband networks, and/or other type of network for transmitting data (e.g., telecommunications and/or media data) between various computing devices, systems, and other communications and media equipment. Computing devices A–N represent any type of computing device, server, cloud computing system, mainframe, or other system that is configured to execute an assistant and communicate on a network. The external systems represent any type of server or other computing system that is configured to support the assistants executing at computing devices A–N.

The external systems and computing devices A–N can be personal computing devices. In some examples, the external systems and/or computing devices A–N may be shared assets of multiple users. Examples of computing devices A–N include mobile phones, tablet computers, wearable computing devices, countertop computing devices, home automation computing devices, laptop computers, desktop computers, televisions, stereos, automobiles, and any and all other type of mobile and non-mobile computing device that is configured to execute an assistant. For example, computing device A may be a countertop assistant device and computing device N may be a mobile phone or automobile infotainment system.

An assistant executes across any combination of external systems one or more of computing devices A–N to provide assistant services to users of computing devices A–N. Examples of assistant services include: setting up reminders, creating calendar entries, booking travel, online ordering, sending messages or other communications, controlling televisions, lights, thermostats, appliances, or other computing devices, providing navigational instructions, or any other conceivable task or operation that may be performed by an assistant.

As a user interacts with the assistant, the assistant may obtain personal information about the user. Examples of personal information include: habits, routines, preferences, notes, lists, contacts, communications, interests, location histories, and other types of user information. After receiving explicit permission from the user, the assistant may store, the personal information at user information data stores and in the course of providing assistant services, make use of the personal information stored at the user information data stores.

The external systems and computing devices A–N and the assistant treat the information stored at the information stores so that the information is protected, encrypted, or otherwise not susceptible to hacking or unauthorized use. The information stored at the information data stores may be stored locally at each of computing devices A–N and/or remotely (e.g., in a cloud computing environment provided by the external systems and which is accessible via the network of FIG. 1).

An example environment in which the assistant may automatically identify which users are present when performance of a task is requested and perform the task based on the identified users is shown in FIG. 2. The environment shown in FIG. 2 includes users A–D and computing device A. In some examples, two or more of users A–D may be in the same location (e.g., a conference room, in the same car or other mode of transport, etc.). In other examples, all of users A–D may be in different locations and communicating over a network (e.g., users A–D may be in an online chat).

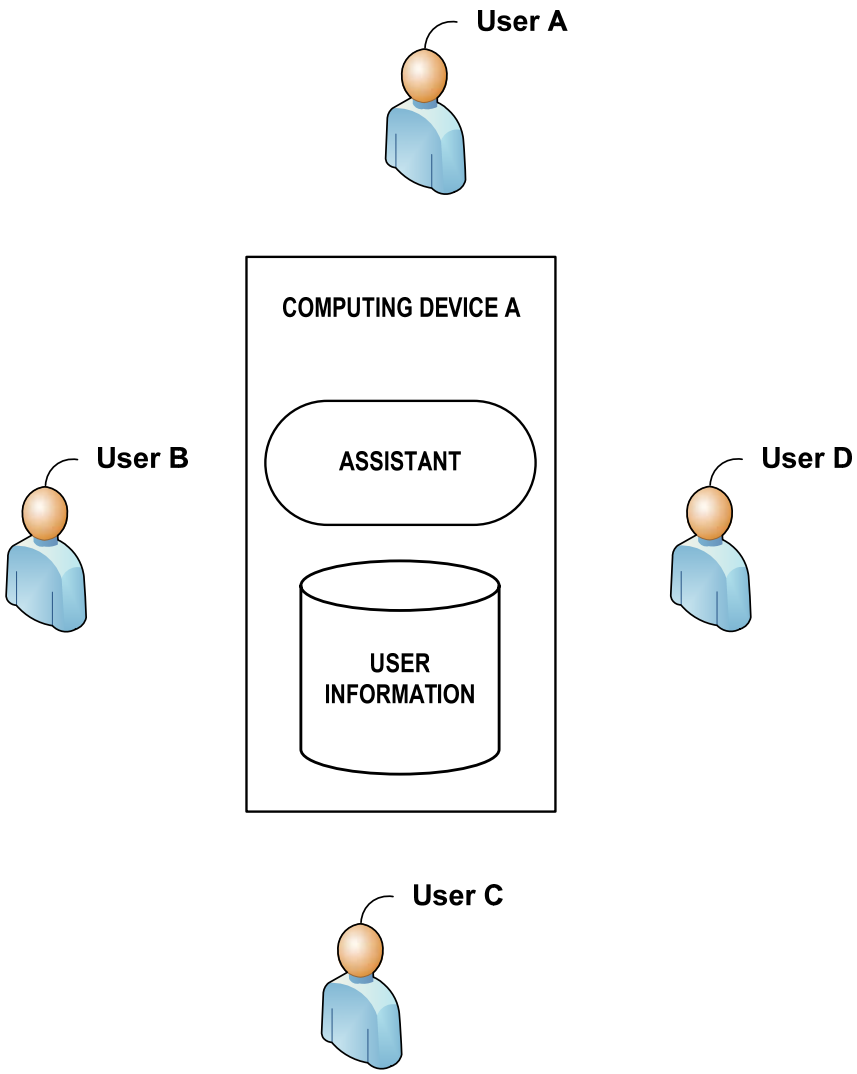

FIG. 2

In operation, a user may request that the assistant perform an operation that involves the other users. For instance, user B may ask the assistant to "order a cab for us." In response to the request, the assistant may identify which users are present. For purposes of this document, a user may be considered present if they are in the same area as the requesting user (e.g., in the same room) and/or if they are in the same conversation as the requesting user (e.g., talking to the requesting user via video chat).

The assistant may use a wide variety of techniques and context to identify which users are present. As one example, if the assistant determines, based on user information for the requesting user, that the requesting user has a meeting scheduled at the time the request is made, the assistant may identify other invitees of the meeting as being present in addition to the requesting user. For instance, if user B has a meeting scheduled on user B's calendar with user A and user D at the time user B asked the assistant to "order a cab for us," the assistant may determine that user A, user B, and user D are present. As another example, the assistant may use a camera to perform facial recognition of users that are near the requesting user. As another example, the assistant may perform voice recognition (ongoing or sporadic) of users speaking near the computing device that detected the voice request to identify which users are present. As another example, the assistant may identify which computing devices are near the computing device that detected the voice request (e.g., via Bluetooth, NFC, Wi-Fi, or other techniques), and determine that users associated with the identified devices are present.

The assistant may perform the requested operation based on the identified users. As one example, if the requested operation is to "book a meeting for us," the assistant may create a meeting event and send invitations to the identified users. For instance, if the assistant identifies users A–D as being present, the assistant may schedule a meeting (at a time that may be based on calendar information of users A–D, depending on permissions) and send invitations for the meeting to users A–D. As another example, if the requested operation is to "order a ride for us to the airport," the assistant may order a vehicle with enough capacity to carry the identified users (and potentially their luggage) to the airport. For instance, if the assistant identifies four users, the assistant may order a vehicle that is capable of transporting four people to the airport (e.g., a minivan, van, minibus, etc.).

By automatically identifying which users are present when a task is requested, the assistant may allow users to request performance of tasks for groups of people without having to list out members of the groups. The above examples are just some use cases for the assistant architecture shown in FIG. 1, the assistant architecture has many other applications and use cases.